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CÆSAR AND THE CENTRAL PLATEAU OF FRANCE.*

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DURING a ten days' confinement to my bed in the spring of 1898, I reread Cæsar's commentaries, partly to pass the time and partly to find out whether Cæsar's campaigns were more intelligible in the light of Professor Davis' lectures on French geography, which I had recently heard. Judge of my delight when I found that the origin and course of the Gallic wars were closely bound up with a very prominent feature in the physical geography of France: namely, the Central Plateau.

Now, this central plateau is a very complex affair, but underlying its complexity of detail is an extremely simple structure, which may be imagined in the following manner:

Suppose France to be a fairly level country and conceive the ground to be suddenly cracked along lines diverging from the mouth of the Isère, on the Rhone, towards Dijon in the north, and Toulouse in the southwest. You will now suppose that the portion of France between these lines is lifted up, as if hinged to Northern France, along a line through Poitiers and Orléans. Along this hinge line there is no uplift, but to the southeast the surface rises steadily until we come to the crack, beyond which the surface lies undisturbed at the old level. The uplifted block has been slightly tilted, but the highest parts are several thousand feet above the undisturbed portion. This tilted block is the Central Plateau, and the cliffs exposed along the cracks, or *faults,* are the eastern and southern Cevennes.

The relation of this conception to the reality is such that if a combina-

*Recent interest in the relations between earth and man makes timely the reprinting of this article from *Journal of School Geography* for February 1899.—EDITOR.

tion of geometric surfaces, such as those suggested above, could be superposed on an exact model of France, the true and the ideal surfaces would be everywhere near each other, and their departures from coincidences could, in general, be completely accounted for from considerations of geological structure and history.

Of the complexities, then I shall say nothing, since, until we are familiar with the general ideal scheme, they merely obscure it. For the rest, they are precisely what the usual maps and encyclopædia notices emphasize, and the reader may find them for himself.

We shall find the drainage of Southern France in good accordance with our general conception. Close to the summit of the Cevennes cliff, in the southeast, rise the streams that flow on long westward and northward slopes to reach the sea through the Garonne and the Loire, while the waters of the Saône and Rhone flow close under the eastern escarpment and away southward to the Mediterranean.

In B. C. 58 the Roman Province in Gaul lay to the south of the Central Plateau, between the great fan of wash from the Pyrennes on the west and the Maritime Alps on the east. In the open valley, to the east of the escarpment the boundary of the Province lay along the Rhone from near Lyons to Geneva.

In free Gaul the powerful tribes seem to have been the possessors of the rougher country. The Sequani held the Jura mountains, with portions of the Saône Valley—the modern departments *Jura, Doubs, Haute Saône,* with parts of *Ain* and *Saône et Loire.* The Aedui held the northeast corner of the central plateau and some lands on the Saône—*Saône et Loire, Nièvere* and part of *Côte d'Or.* The Averni held the western and central portion of the central plateau in the departments *Cantal, Puy de Dôme, Allier* and part of *Haute Loire.* These were the three most powerful tribes.

We must remember that this was a period of tribal migrations and the possessors of the high country were in the best position to defend themselves at home and even to hold some of the adjoining lowlands. Thus the Aedui and Sequani were able to control the whole of the Saône valley from the highlands on either side.

But our especial interest is in the Swiss tribes whose seat is marked at the eastern border of the map between the Jura and the Alps. So to-day six sevenths of all the Swiss people live in the same great valley between Jura and the Alps though half their territory is in the high Alps. The valley narrows westward at the Lake of Geneva and its outlet, the Rhone, but broadens eastward to the uplands of southern Wurtemburg and Bavaria. This should be seen on a good map. The Sydow—Habenicht wall

map of Europe shows it as a white area between 200 and 500 meters stretching across Lake of Lucerne and Rhine. So, though less plainly, the world in hemisphere of the same series, or if neither of these be at hand, the colored relief maps in Partsch's Central Europe, (Appletons). It is significant of the backward state of our maps that our geographies and

atlases are of no help here. But if the works referred to be consulted it will be seen that the road by which the Helvetians originally came to Switzerland from Central Europe was in all likelihood along these uplands north of the Alps and south of the Swabian Alps and Black Forest. The Germans were now crowding after them along the same highway.

In 58 B. C. the Swiss Gauls became discontented with the narrowness of their territory under this pressure, and sought to migrate from the regions north and east of the Lake of Geneva to the sea coast between the Loire and the Garonne. The natural road is deflected southward by the Cevennes uplift and passes through the lowland to the south of the central plateau, going through territory already occupied by the Romans and thence over the low watershed at the sources of the Garonne.

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To prevent these 400,000 barbarians from passing through his territory Cæsar entered on his Gallic campaigns. He kept them north of the Rhone, attacked them fiercely as they were crossing the Saône to ascend the escarpment they could not avoid.

Thence he pursued them up the west bank of the Saône as high as Mâcon, where they struck into the highlands by a pass to the northwest towards Cluny and Autun, that for centuries was the usual line of westward travel from Mâcon and is now followed by the railway. The pass had this advantage for the Gauls, that it saved them from flank movements. All that Cæsar could do was to follow closely in the rear. Near Autun a battle was fought and the Swiss completely routed. In the pursuit of the fugitives the Roman troops reached the upper tributaries of the Seine.

So far, Cæsar's campaign conferred a positive benefit on the Gallic tribes, whose territory the Swiss had threatened with invasion. He was now invited to add to this service the expulsion of the Germans under Ariovistis, who had crossed from the open valley of the Alsatian Rhine to the Saône valley, where they endangered the very existence of the Sequani and Aedui. Cæsar drove the Germans out, but left his troops to spend the winter at Besançon, while he returned to northern Italy to hold court and attend to matters of administration. He was enabled to make this long journey almost unattended by the friendship of the Aeduans.

But the presence of the Roman army through the winter annoyed the Gauls to the extent that there was extensive arming and preparing for war among them, and Cæsar in turn took offense at these preparations. From these resentments followed the summer campaigns and winter conspirings of the next six years.

These summer campaigns led the Romans pretty well all over the portions of France east, north and west of the central plateau, across the Rhine and the English Channel. But the Gauls, though everywhere defeated, did not fail to learn something of Cæsar's method of fighting and to note that much of the Roman success in arms depended on the presence of Cæsar himself. Thus in 54 B. C., when the scanty harvest following a drought had induced Cæsar to scatter his legions in separated winter quarters, Sabinus and his troops were destroyed in their isolated quarters, probably at Tongres, and the brother of Cicero, the orator, only escaped a similar fate by his prudence and the timely approach of Cæsar. Again Cæsar was victorious, but the impression had gained that all must unite and attack the Romans when Cæsar could not lead them, if Gaul was to recover her liberty.

Many futile attempts were made in this direction, culminating in the great uprising of the year 52. Then for the first time, the Arverni of the Central Plateau joined their fellow Gauls, and for the first time so grave a doubt was thrown on the fealty of the Aeduans, Cæsar's long-time allies, that he dared not expose his life by a journey through their territory. The Arverni succeeded not only in calling out the tribes of the Garonne valley, but in producing great restlessness in the Roman Province itself.

Cæsar cannot join his troops by the usual route up the Rhone-Saône lowland, still less by the western passage through the Garonne country. He does not care to run the risk of calling his legions to fight their way south without his leadership. His mind is made up quickly. While it is still winter, he scales the southern Cevennes escarpment with a small body of troops, passing through six feet of snow into the country of the Arverni at Le Puy and Brioude, and harries the country with his cavalry. When Vercingetorix, leader of the Arverni, is called southward to the upper plateau to defend his home country, Cæsar, leaving his cavalry to continue the appearance of his presence and activity on the upland, swiftly hastens to Vienne on the Rhone, gathers another band of horsemen, and crosses the Aeduan country by long stages while they still think him engaged in raiding the plateau in the south. Effecting a junction with his legions, he opens another season of victories, and the Gallic tribes are subdued never again to rise against the great commander. The plateau country is reduced despite the successful resistance of its stronghold, Gergovia, and all Gaul is Cæsar's.

The strong escarpment of the eastern Cevennes deflected the Swiss Gauls in 58 toward Roman territory and brought Cæsar into the field. It guided Cæsar's usual journeys up the Rhone valley in the years that followed, and in 52 offered a fancied barrier to invasion that Cæsar broke with his pretence of raiding the southern plateau, to cover his hasty journey over the accustomed route.

A central lowland in 58 would have allowed free westward passage to the migrating Swiss; they would have avoided Roman territory, and Cæsar would have lacked occasion to invade free Gaul, which might never have come under Roman sway.

A central lowland in 52, lacking the rampart of the southern Cevennes, must have been guarded by the Gallic tribes; Cæsar might have failed to effect a junction with his troops; Gaul might have been lost, and Cæsar ruined in the esteem of the Roman people.

So the heights that had guarded the Arverni from invading Germans, finally brought Gaul under the yoke of Rome, and served Cæsar as a stepping-stone to the highest pinnacle of power.

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REFERENCE BOOKS AND PHYSICAL GEOGRAPHY TEACHING.[1]

By WILLIAM T. MORREY
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NOT a few of the high schools of the state of New York neglect the use of reference beeks in the teaching of physical geography. At the other extreme is Horace Mann School, where all books used are reference books. The increasing interest in laboratory work has tended to decrease the book work, perhaps in a few schools; but, on the whole, the increased interest in the subject, the more excursions, the more lantern work, tend to take the pupils into the library to supplement their texts.

Some teachers prefer to assign in advance to selected pupils specific topics to be reported on when the class takes up the new subject. This method requires more thought of the pupil and benefits the individual most. Such reports may not be as good as those made by the pupil who approach their subjects with more preliminary knowledge. Many teachers prefer to present new topics in their own ways. Another method is to have the reports expand, emphasize or make specific the subject that has been presented by the teacher and studied by all. The third method is the one I have used to bridge the week or two between examinations and the end of the year. I also used it to prepare for the examinations. It serves as a pleasant and profitable review. It enables the pupil to apply his general knowledge to some specific new problem. It gives a little training in work more or less of the nature of research. All the reports tend to acquaint the class with the available literature of the subject. There is also some satisfaction, undoubtedly, in being recognized as authority on at least one subject.

When I am ready to start this library work, I read lists of topics that have been discussed or that may be worth discussing. Suggestions are asked. I then have every pupil make out a list of four or five topics in their order of preference. I then at my leisure go carefully over these lists and assign to each pupil as nearly as possible what he asked for or what I think will do him the most good. If necessary to cover very desirable ground, pupils are assigned topics without consulting their preferences.

Pupils report—sometimes by reading a formal essay (counting at times as one of the formally prepared papers for the English Department),

[1]Delivered before the Earth Science Section of N. Y. State Teachers' Association, New York City, Dec., 1906.

sometimes by an informal talk with or without brief notes. We have had very creditable pupil lectures illustrated by stereopticon.

Synopses or outlines on uniform paper have at times been required of every pupil. In later terms these synopses may be turned over to other pupils to combine, classify, criticize, or use in the treatment of the same topic by some new authority in the same field.

I shall suggest in the approximate order of the Syllabus some topics given in the reference books suggested in the Laboratory Guide for Physiography issued by the State Education Department at Albany, to accompany the N. Y. State Syllabus in Physical Geography.

1. The *Nebular Hypothesis* as generally presented is well stated in Winchell's World Life.

2. The *Planetesimal Theory* was studied at odd times for weeks from Chamberlain & Salisbury's Geology and presented in an address that would have been honored in any of the sections of the A. A. A. S. I believe with the pupil that this piece of work was one of the most valuable things she did in her whole high school course. It was a labor for love of science.

3. Purely astronomical subjects are seldom chosen by my pupils, but one girl especially interested along this line gave us from Cyclopedias, Todd's Astronomy, etc., a very valuable paper on the *Moon.*

4. With reference to the *Sun* I hope to get an interesting paper based on the Smithsonian reprint pamphlet on the Solar Radiation, Davis-Meteorology, and Hann-Climatology.

5. *Why the Sky is Blue* is discussed in Davis, etc.

6. *Clouds* have been studied from Ruskin—Modern Painters, "On the Truth of Skies" and U. S. Government Cloud Chart. No course in Physical Geography has been in vain if it teaches a lifelong interest in the clouds and an appreciation of their beauties. I prize among my pleasantest recollections the opening of certain minds to the beauties of the skies.

7. *Climate* I have had studied in connection with the topographic features of various countries and states so widely distributed over the world that the principal types will be illustrated. Every pupil should select at least one country, state, city, or island to show the inter-relations between the climate, topography, manners, customs, principal products and history.

Mill—International Geography may be taken as a basis upon which to build; the Bædekers, Partsch—Central Europe, Mackinder—British Isles, Bulletins of the Bureau of American Republics, and Bartholomew—Atlas of Meteorology.

England, Ireland, Scotland, *Spain,* Germany, Russia, Italy, Greece, Egypt, *Palestine,* Mongolia, Japan, *Philippines,* Australia, Hawaii, Chili, Peru, Ecuador, *Colombia,* Jamaica, Cuba,—California, Texas, Florida, Virginia, New York, Ohio, Minnesota, Washington—*San Francisco,* Mexico City, Pekin, Madrid, Lisbon, etc. Comparisons of cities along the same parallel as *New York and Denver, Lisbon and Madrid.*

8. *Changes in Climate* may be considered in the study of Lakes Bonneville and Lahontan—U. S. Geol. Survey, Ball—Ice Age, (Croll—Climate and Time).

9. *Climate of New York State.* Turner in Tarr—Physical Geography of New York State.

10. *Climate of New York City* in the Annual Averages and Summaries of the Meteorological Observatory in Central Park.

11. *Life in the Sea,* Origin of Life, Sea Bottom in Smithsonian Reprints, Mill, Hickson—Life in the Sea.

12. *Mediterranean*—Smithsonian Reprints, Suess, (Reclus).

13. *Sea Level* and the Disturbing Effects of Land Masses thereon, Effect on Gravity—Suess—Face of the Earth.

14. ***The Deluge*** is treated in an interesting way in Suess, but as yet I have not ventured to have it discussed in my classes composed, as are all of New York City public schools, of pupils of many religions.

15. *Caves, Ground Water,* etc. Shaler—First Book in Geology.

16. *Life History of a River,* Russell—Rivers of North America.

17. *Niagara Falls,* Physiography of the United States and several reports published by the New York Museum, Niagara Commission.

18. *Lakes,* Tarr—N. Y. State Physical Geography. Dryer—Indiana Geography, Lakes *Agassiz, Bonneville, Lahontan*—U. S. G. S. Reports, Lake *Passaic*—New Jersey Reports, Lake *Iroquois,* N. Y. State Reports.

19. *Glaciers* are very popular subjects. Ball—*Astronomical Causes of an Ice Age. Glacial Phenomena:* Tyndall—Forms of Water—Russell—*Life History of a Glacier* in his Glaciers of North America, *Work of a Glacier*—Chamberlain and Salisbury—Geology, *Glacial Marginal Lakes,* Woodworth—Pleistocene Geology of Long Island. See above under Lakes also.

20. *Rocks of Manhattan*—Gratacap—Geology of New York City in connection with Diller—Study of Rocks.

21. *Clay,* a chapter in Ries—Clays of New York State, State Museum Report.

22. *Soils.* Handful of Soil—Cornell Nature Study Series.

23. *Diastrophism, Vulcanism, Gradation* should be studied from Powell's articles in the Physiography of the United States.

24. *Dislocations,* Suess, Vol. I.

25. *Volcanoes* is the first choice of the most pupils. Assign *Vesuvius, Pelee, Hawaii, Etna, Hecla,* to various pupils. Refer to the geologies in stock.

26. *Stages of Denudation of Volcanoes,* Suess.

27. *History of the Palisades.* U. S. Geologic Folio 83, New York City.

28. *The Work of the Winds.* Chamberlain and Salisbury—Geology.

29. *Geographic Cycle.* Dryer—Physical Geography.

30. *Plains.* Tarr—New York State Physical Geography.

31. *Plateaus.* (Powell's Colorado) Dutton in Vol. 2, U. S. Geol. Survey.

32. *Mountains.* Lubbock—Scenery of Switzerland, Tarr—N. Y. Physical Geography, Chamberlain and Salisbury, etc.

33. *Shore Lines.* Avebury (Lubbock)—Scenery of England, Geikie—Scenery of Scotland.

34. *Coral Islands and Coral.* Geologies.

35. *Mangrove.* U. S. Geol. Survey, Annual Report 17.

36. *Harbors.* Shaler—Sea and Land, and in U. S. G. S. Annual Report

There are always many interesting questions about one's own neighborhood the

investigation of which in the field or in what has been published adds enthusiasm and interest. I add a few that suggest themselves about New York City.

37. *How does it come that the Hudson River is where it is?*

38. *Account for the Harlem Plain.*

39. *Account for Mount Morris.*

40. *What agencies may have determined the location of the depressions through the east bank of the Hudson* at Spuyten Duyvil, Inwood, Manhattan Street and 129th Street, and Canal Street?

41. *Former Drainage of Manhattan Island,* (Col. Waring—Half Moon Series, Holt & Co.).

42. *Folds and Faulting Here.*

43. *The Malaria Map and What it Shows.*

44, 45. As a general summary it would be well to divide among several pupils the various chapters of Prof. Brigham's Geographic Influence on American History and Semple's American History and its Geographic Conditions.

46. Romanes—*Scientific Evidences of Organic Evolution* lends itself readily to presentation in class and serves as an excellent means of correlating anatomy, paleontology, geology, and other sciences with our subject. It is interesting, instructive, and stimulating. Its discussion serves as a fitting conclusion to the term's work.

REMARKABLE DEVELOPMENT OF THE BANANA TRADE.—One of the most interesting features of the development of closer trade relations between the United States and Europe and the countries bordering on the Caribbean is the growth of the banana business. It has advanced to such proportions that it is now far beyond the most optimistic predictions of ten years ago. If it builds up in the future as it has in the last few years it would seem to be only a question of time when bananas would become one of the common food products of the masses of people in the United States and Europe. It was not long ago that bananas were regarded almost as a luxury; now they are becoming cheaper even than apples in the apple country of the United States. The great benefit to the Caribbean countries in the growth of this trade is the converting of large areas of apparently useless jungle into most valuable plantations. Thousands of square miles, which five years ago were considered valueless and only fit to breed mosquitoes, are now fruitful sources of revenue in the production of bananas, and towns are being built up all along the Caribbean coast where before there was no life or activity.

—Bulletin Bureau of American Republics.

A PLEA FOR A BROADER CONCEPTION OF ECONOMIC GEOGRAPHY

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WHAT is economic geography? Probably no question has been asked with greater frequency in the educational world during the past ten years. Schools and colleges have been introducing the new study, public interest has been here and there aroused, and curiosity awakened to know what it is all about.

There has been no uniformity of definition. Even the terms used to designate the new field have smacked of uncertainty, variety and ambiguity, and descriptions have differed with each new text-book that has appeared. One man speaks of commercial, another of economic geography, these terms being used sometimes interchangeably, sometimes as indicating separate fields. Yet others call it industrial geography, applied geography, geography of trade, geography of commerce, etc.—all of these being more or less differently defined, but all of them, if we are to judge from the so-called text-books, covering much the same fields of inquiry.

The formal attempts to describe the field have shown the same confusion. We have but to examine a few of them to realize how much of uncertainty and difference of opinion exists. "Commercial geography describes the world in its relations to man as a producer and as a trader," says one. "Commercial geography," says another, "is not a separate branch of geography. It is merely the consideration of geographical facts in so far as they subserve particular ends and bring about particular developments. In studying it we confine ourselves to a restricted view of general geography. We no longer ask how certain facts affect man, but we ask how they affect him in his manufactures, commerce, and agriculture, or, to use the most general terms, as a producer and consumer."

Yet a third says, rather vaguely, "Political geography regards the earth as the dwelling place of man and as the scene of his intellectual and social development. As a special phase of this, commercial and industrial geography look upon the earth from the geographical point of view as an economic organism, and the separate states and countries as interacting parts of the same."

A fourth tells us that its object is to "show the connection between the nature of countries and places and their products, trade routes, and resulting social conditions."

Commercial geography is "the study of the geographical facts relating to commerce" we read in another place; while in yet another we find that it is the study of "commercial life as it is influenced and determined by geographical conditions." The geography of commerce includes what is coming to be understood as economic geography,—the production and distribution of raw commodities,—and industrial geography,—or the location of manufactures and the distribution of their products." "In last analysis, life is conditioned by physical environment: the geography being studied is, therefore, a statement of the facts and laws of the physical universe affecting man's economic life; or, it deals with the earth in its relation to man's physical well-being. In brief, the geography of commerce sets forth the things that the earth does or is made to do, in supplying the material needs of men."

These are but illustrations, and they might be multiplied, of the vagueness, variety, and ambiguity of definitions of the field of economic geography. These differences of definition might be expected to lead to variety of treatment; but, as a matter of fact, the text-books thus far produced seem all cut out of one piece, varying chiefly in distribution of emphasis. One is ill-balanced because it places undue emphasis on a particular country or group of countries; another because it considers products rather than processes; some lose sight of the geographical factors entirely (except in the narrower sense of that term as indicating mere distribution in different localities) and simply give an encyclopedia of facts. All, however well they begin, sooner or later drift away in this last direction. To use the words of Professor Keasbey, "The most that can be claimed for these commercial geographies is, that they are convenient repositories of useful information regarding the products of different countries, the established routes of trade and the relations between imports and exports."[1]

This condemnation is too sweeping; for many of the books contain at least hints of a broader conception, and some of them have developed the suggestion in certain directions to a considerable degree. But even these lack consistency and completeness.

Professor Keasbey himself has pointed out more clearly than any other American writer the claims of economic geography to a broader treatment. Whether we agree with all of his conclusions, or accept his classification or not, the point which he maintains and demonstrates is well taken, that economic geography if it is to establish a claim as a separate branch of science, must get away from its narrowness and vagueness, must establish

[1] Prof. L. M. Keasbey, The Study of Economic Geography, Pol. Sci. Q. March, 1901. See also his article on The Principles of Economic Geography, Pol. Sci. Q. September, 1901. The present writer wishes to acknowledge his indebtedness to Prof. Keasbey for many of the expressions and distinctions used in this paper.

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its connection with other sciences and become consistent; must enlarge and at the same time delimit its field.

The name implies a connection with two established sciences. The economic side of man's life has been taken as the peculiar field of economics, the description of the earth has been claimed as the peculiar field of geography. If economic geography merely gathers statistics and facts for the use of the economist, it is a part of economics and is geographical only in the sense that it concerns itself with various portions of the earth; if it looks simply at geographical phenomena without concerning itself with the economic consequences of them, it is merely a part of geography and has no special claim to separate consideration.

We can perhaps get a clearer conception of its true content if we approach it from the two different points of view. Looking at it from the standpoint of economics we may see how it will serve economics—from the standpoint of geography we may learn how economics may direct and determine its activity.

Economics has gone through many changes since the days of Adam Smith. He took up the subject as a practical discussion of the causes leading to the wealth of nations—*causes* of all sorts—and as a protest against a prevailing policy. He used both induction and deduction—drawing his data for induction from many sources. His successors generalized the data for induction, formulated their three fundamental assumptions, and proceeded to build up what came to be known as pure theory of supposedly universal application. Later, attempts to apply theoretical results to practice, and criticism from so-called practical men, led to re-examination of the assumptions, modification in many particulars, revisions of the theory:—a sort of zigzag progress, theory giving point to induction; induction modifying and furnishing a basis for further deduction.

There is, it is true, a sense in which economics may be called a universal science, yet so different are conditions in various parts of the globe that any theory based on assumptions which are approximately correct for one country is apt to need serious modification when an attempt is made to apply it to others.

Reasoning based on the idea of free competition, the free movement of capital and labor, may be fairly correct for certain small sections of the world; but in most regions such freedom of movement and competition does not exist. The modification of the earlier theories of distribution by the introduction of the concept of non-competing groups, is a recognition of the necessity of giving heed to such differences.

The theory of diminishing returns in agriculture—or at least the ideas

as to the applicability of the theory—has been profoundly modified, not only by the opening up of new regions of virgin soil, but also by improvements in scientific agriculture, introduction of substitute goods, the development of transportation by greater mastery of the forces of nature and the overcoming of physical obstacles to intercourse.

Economics, in its best sense, is a practical science. It has as its object (as it has in its origin) such a study of the resources of nations as shall give mankind a better understanding of the causes on which national material welfare rests, and a grasp of the methods by which such welfare can be attained. It is essentially a study of man *and* nature, but it has been so busy examining the *man* side of the dual activity that it has at times entirely lost sight of the *nature* side.

When it has taken up this study at all, the tendency has been to do so with a restricted vision. Recognizing the patent fact that countries differ, it has contented itself with the more general questions of *production* of different goods in different lands. Yet geographical forces go far deeper. They affect every activity of man and they affect man himself. They not merely cause differences in the kinds of products drawn from different regions of the earth,—they touch every activity. And in the economic field it is not merely the production of different classes of material commodities with which we are concerned, but all the economic process—the production, exchange, distribution and consumption of goods.

More than this: economics in examining the part which nature plays in economic activities has for the most part restricted itself to the consideration of differences as they exist at any one time. It has paid little, if any, attention to the changes in which geographical factors play a part. It has not sufficiently examined the forces and the processes by which nature coöperates in developing one country as compared with another. It has not merely, therefore, looked too exclusively at the operation of geographic factors in one branch of economic activity: it has also disregarded the effects of geographic forces in bringing about redistributions of the nature elements in economic life.

The province of economic geography is, therefore, to supplement and broaden economics by describing and explaining the part which nature plays in economic life; and it demands that the connection be made not at any one point in the economic series, but all along the line, that consideration be given not merely to nature's work in the *production* of goods, but in exchange, distribution and consumption as well; that heed be paid not only to differences which happen to exist between various lands at a particular time, but also to the forces at work producing changes in these differences themselves.

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To explain more fully it is necessary to say a word as to the development of the science of geography. In its beginnings it was a mere graphic representation of parts of the earth's surface. This passed into written description. Then came a broader conception of the earth, not merely as an object to be studied and described, but as the environment within which man lives and works. Thus geography, like economics, came to consider the man side and the nature side of the world's progress. Economics regarded man as working on nature; geography, nature working on man. In spite of differences of opinion arising from time to time between the so-called "historical" and "scientific" schools of geography, these two elements, man and nature, may fairly be considered to-day as essential features in the science of geography.

The broadest scientific geography of to-day is no longer content to be a mere descriptive science. Time was when geography meant simply the ascertaining and describing of facts in various regions of the world. It was merely distributive and descriptive. Locations of lands and seas, divisions of nations and peoples, plotting of maps, picturing political, racial or religious groups, describing countries or continents or regions, their peoples, their climates, their products, etc., were its aim. In short the study was descriptive and static. This no longer suffices. The science has become dynamic. Study of the earth reveals changes, descriptions of yesterday no longer accord with the facts of to-day,—peoples move, products change, distribution alters as human and climatic forces operate in varying ways in various lands. The time element must be recognized, and unless geography is to become merely a series of ever altering descriptions, it must make the determination of how time alters conditions, a part of the study. Thus it has come to deal not with mere facts of geographical distribution, but with forces producing that distribution.

In short, geography is no longer self-centered, it studies the earth not merely as an object of curiosity, but as the home of man: it is no longer static but dynamic; no longer merely descriptive, but a searcher after causes.

In process of this development, geography has undergone a certain recasting of its materials. Within the broader field a differentiation of special fields is necessitated. The older descriptive geography dealt mainly with the earth as an inorganic object. The study of the earth in its relation to life introduced organic elements and we have a fundamental division into what may be called, by something of a stretch of the terms, inorganic and organic geography,—one examining the earth merely as a mass of inorganic material, while the other concerns itself with the earth in its influence on the life upon it. One may be called physical, the other

biological, or by contraction physiography on bio-geography. Further differentiation, necessitated by the expansion of the science, gives us the well known division recognized to-day into mathematical geography, or the study of the earth in its relations to the rest of the universe; physical geography, the study of its physical material characteristics; and bio-geography, the study of the earth in relation to the life existing upon it. And bio-geography in turn is divided into botano, zoo, and anthropogeography.

This differentiation presents an ascending scale of classification. They are not independent studies: they are so related that each division of the list is dependent upon all the preceding divisions. Physical geography can only be complete when its grasps the facts revealed by mathematical geography (climate, for example, can only be understood when the motions of the earth, the relations to the sun, etc., are grasped). Biogeographical questions can be answered only by reference to facts revealed by mathematical and physical geography—and so on down the list. Anthropogeography presupposes all the others and is capable of complete comprehension only when the antecedent divisions are mastered.

Now economic geography is clearly connected with anthropogeography, dealing as it must with the relation between geographical factors and one aspect (the economic) of the life of man on the earth; and like it and through it, it draws its materials from all the preceding branches of the science. The fundamental defect of much of the teaching and writing of economic geography, especially in the United States, is the fact that it does not recognize this essential relationship. Failing to recognize it or at least failing to act on the recognition, it becomes merely descriptive of things as they are, does not sufficiently explain *why* they are or give any comprehensive grasp of the possibilities or impossibilities of change. It produces text-books which are little more than "useful compendiums of information," and even this limited usefulness depends largely upon the frequency of their revision.

The supplying of useful information is perhaps worth while, but it does not entitle the study which provides such information to be considered as a dignified and independent branch of a great science. To attain such a position it must explain as well as state, must give causes as well as facts, must broaden its conceptions as well as delimit its field. Its *facts* must be drawn from the whole field of the science of geography—its *object* must be to help economics explain the economic progress of mankind. Only as it does this will it show itself worthy of serious study.

In the broadest sense, man is the product of his environment. His very existence depends upon the geographical phenomena with which he is

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surrounded, and every act of his life is directly or indirectly affected by the geographical conditions within which he lives. There is not a fact within the cognizance of the whole range of the science of geography which does not in greater or less degree have an influence on his activities and among them, of course, his economic activities. Economic geography is an interpretation of these geographic phenomena in the light of man's economic activity. It goes through the whole range of the science and seeks to explain the relationship between environment and economic life. Some of the relations are so simple and obvious that we often lose sight of them. The alternation of night and day, the varying length of night and day in various regions of the earth, the round of the seasons, the antithesis of seasons in the northern and southern hemispheres, the rotundity of the earth and its effects upon the determinations of trade routes, are so familiar that we forget their economic importance.

Other phenomena have less obvious, but even more vital, connection with our life. The effects of that congeries of phenomena known as climate on the distribution of products; climatic effect on the character of food required, and the effects of food on human activities; the possibilities of broader distribution of certain animal and plant forms, with a little assistance from man; the introduction of new products and processes; effects of altitude on human life and on the efficiency of various classes of power engines—these are mere hints of the vast number of questions which are essentially economic, the answers to which geography must supply.

Economic geography, thus broadly conceived, attains a dignity which sets it apart from the more or less haphazard collection of facts which to-day masquerades under that name in so many of our schools. Indeed, if it is entitled to this broader treatment, it seems hardly a proper subject for secondary school teaching at all. Its bases are too broad. It cannot be taught properly until the pupil is grounded in the antecedent facts of geography itself. The student must grasp thoroughly the elements, at least, of the inorganic divisions of the science before he can get any adequate conception of the relations between the inorganic and the organic. And the teacher needs more. Not only is each division of the science of geography grounded on the preceding branches of geography itself, but each is based upon an antecedent independent science; mathematical geography upon astronomy; physical geography upon geology; bio-geography upon biology, etc. The great text-book of the future can be written only by a man who is thoroughly equipped with this basic training.

EDITORIAL

THE STATUS OF COMMERCIAL GEOGRAPHY

THE JOURNAL gives space with pleasure this month to an original article on commercial geography, dealing with the point of view in reference to the subject in this country. Certainly the time is ripe for a calm, scientific, practical discussion of the point of view that should hold in reference to such an important and proven subject as commercial geography. Less than a decade ago commercial geography was practically unheard of outside the "Business Colleges." Now it is widely taught in all grades of educational work and with varying degrees of success. The status of the subject, as in the case of many subjects below the college, has been largely determined by the text-books, and the texts, though differing in many ways, have been strangely drawn on similar lines.

In no text known to the writer has adequate attention been given to the principles underlying commercial geography. The physical conditions have been treated as fully as the authors felt was possible, but there has been a striking absence of any consideration of economic principles as a fundamental part of the subject. Commercial geography is not and can not be considered as a mere consequence of certain physical conditions. Commerce is a question of economics as much as it is a matter of overcoming physical distances by means of power. Commercial geography, under whatever name it may be treated, must include a discussion of the economic side of the subject if our high, normal and college pupils are to be ready to make use of the subject in a practical and scientific way in the business world.

It is to be hoped that a discussion of the subject at this time may help create a demand for a series of texts unlike any now on the market in this country, but which will surely follow closely any real demand.

NEWS ITEMS

The next meeting of the Department of Superintendence of the National Educational Association will be held in Washington, D. C., February 25-27, 1908.

The Forty-Sixth Annual Convention of the National Educational Association will be held at Cleveland, Ohio, June 29 to July 3, 1908.

Mr. Isaiah Bowman of the Department of Geography of Yale University has recently returned from a trip of several months in Northern Chile and Bolivia, during which he made a special study in a systematic

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way of the correlation between the physical features and the habits, customs and occupations of the people.

Professor George D. Hubbard of the Ohio State University has published in the November, 1907, number of the *Bulletin* of the American Geographical Society, some very interesting results of laboratory experiments with aggrading and degrading streams. His experiments were conducted in a water-tight tank two feet wide, sixteen inches deep and eighteen feet long. The results of nature were reproduced with great accuracy, especially in reference to the formation of alluvial plains and terraces. Incidentally, certain details were produced which may or may not be characteristic of rivers and which give a basis for field verification.

RECENT PUBLICATIONS

LARGER TYPES OF AMERICAN GEOGRAPHY. By Charles A. McMurry; pp. viii+271. The Macmillan Company, 1907.

This, the third volume in the author's well-known series of "type" studies of geography is especially adapted to the upper grammar grades, and includes a treatment of the Appalachian Mountains, the Rocky Mountains, the Pennsylvania Railroad, the First Pacific Railroad, the Mississippi River, the Iron and Steel Business, Cotton Mills and Cotton Manufacture, New York City. Interesting reading, but not wholly satisfactory as a reference volume for supplementary work.

ERDKUNDE FUR HOHERE SCHULEN. By Heinrich Fischer, A. Gristbeck and M. Gristbeck. pp. xi+351. Munich, R. Oldenbourg, 1907.

A manual of physical and regional geography, with special treatment of the German Empire. Valuable for reference.

THE SAN FRANCISCO EARTHQUAKE AND FIRE AND THEIR EFFECTS ON STRUCTURES AND STRUCTURAL MATERIALS. Bulletin 324, United States Geological Survey, 1907.

Splendidly illustrated account of the great earthquake and accompanying fire, illustrating especially the effects on structures and different methods of construction.

GEOGRAPHICAL STORIES RETOLD FROM ST. NICHOLAS, in six volumes, entitled respectively Western Frontier Stories, Stories of the Great Lakes, Island Stories, Stories of Strange Sights, Sea Stories, Southern Stories. The Century Co., 1907.

A series of supplementary readers collected from the past volumes of St. Nicholas. Accurate, interesting and readable, but not grouped so as to fit well into the customary course of study for elementary schools.

NOTES

OCEAN FREIGHT RATES.—While cost of performing the service fixes the minimum rates at which shipowners can afford to carry goods, ocean freight rates, at a given time and place, depend largely upon demand and supply; that is, upon the relative quantities of merchandise to be shipped and the capacity of vessels available for carrying it. A large number of vessels in a port where but a small quantity of traffic is offered tends to cause low rates from that port, while, on the other hand, where there is much merchandise to be shipped and vessels are relatively scarce, shipowners can obtain higher rates.

The volume of ocean space, or "tonnage," as it is frequently called, available in a given branch of traffic is subject to increase in at least two ways: First, by the building of new vessels, and, second, by the release of a number of vessels from other branches of traffic. An increase in tonnage may either cause a reduction of rates or prevent a rise. The tonnage available for certain trades is subject also to decreases, but these are generally due to vessels being attracted from the trade in question by better freight rates elsewhere rather than to loss of any considerable number of ships.

The influence upon freight rates due to stopping an important branch of ocean traffic is illustrated by events which occurred at the close of the South African war. A considerable amount of ocean tonnage had been employed by the British Government in the transportation of troops and supplies to the scene of conflict, and when the necessity for this service came to an end, early in 1902, a large amount of cargo space was thrown out of employment and the vessels thus affected joined in the competition for mercantile traffic. The effect on rates, especially in the charter trade, was marked.

Moreover, the volume of traffic is subject to variations, some of the most important of which are caused by the condition of harvests in various regions. Poor crops tend to bring rates down, while, on the other hand, abundant harvests promise higher freight rates, which may be still further increased if the traffic in some other articles causes another strong demand for "ocean room" just about the time the produce of the harvest is to be shipped.

Another instance of a considerable supply of "ocean room" being thrown upon the freight market was afforded in 1903 when the wheat harvest in Australia failed. While the wheat was still standing in the fields a number

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of vessels started for Australian ports to carry a share of the expected wheat surplus to Europe. Meanwhile unfavorable weather conditions resulted in a crop failure, and grain cargoes in Australia were scarce. A considerable number of ships was unexpectedly thrown out of employment. Some of them sailed to the Pacific coast of the United States for loads of wheat or barley, while others went elsewhere in search of cargoes. This condition no doubt contributed toward reducing the mean rate on wheat between San Francisco and the United Kingdom from about 32 cents per bushel in 1902 to about 18 cents in 1903.

The rates which had declined at the close of the South African war continued rather low until the big harvest in the United States in 1905, when there was a revival in the demand for ships for charter, especially on the Atlantic seaboard. It had been reported that the charter traffic had entirely died out at the four largest ports along the North Atlantic coast, but in the fall of 1905 there was a considerable number of grain charters made from Baltimore and Boston.

On the Pacific coast it is not so easy to trace the effects of the demand for grain ships in 1905, owing to the influence of a conference or combine formed by owners of British, German and French sailing ships about 1904. This conference undertook, and still undertakes (1907), to maintain a schedule of minimum rates from Australia and from the United States Pacific coast to the United Kingdom. Members of the conference are to accept no cargoes at rates below the minimum fixed by their agreement.

An important influence in determining the cost of hiring a ship is the prospect of securing another cargo at or near the port of discharge. Lower rates are accepted by a ship for carrying goods to a place where and at a time when a return cargo may be secured than to a place offering no return shipments. For instance, the ports on the Pacific coast are desirable destinations for sailing vessels expecting to reach that coast in the fall and early winter, for there at that time a supply of wheat and barley is ready for shipment to Europe. The same applies to other ports which are outlets for surplus crops.

Early in April, 1907, a steamer was chartered to carry a cargo of general merchandise from New York to Australia and New Zealand, the rate named being 31 shillings per ton. About two weeks later another vessel was chartered to make a similar voyage for 28 shillings 6 pence per ton. This reduction was due partly to the fact that the second vessel was expected to reach its destination when the prospects for securing a return cargo were more favorable than for the other vessel. The first ship was

to leave New York in April or May; the second was chartered for late in May.

It will be seen from these few examples that the shipping business is a world of traffic, and that influences in one region are felt in a number of others. The shipper at Tacoma, Galveston, or Newport News has a direct interest in the crop conditions and the supply of vessels in the neighborhood of Calcutta, Odessa, or Buenos Aires.

From Ocean Freight Rates. Bulletin 67. Bureau of Statistics, U. S. Department of Agriculture.

THE AREAS OF THE UNITED STATES, THE STATES, AND THE TERRITORIES.—BY HENRY GANNETT.—In 1881 the Census Office published in an extra bulletin tables showing the areas of the United States and of the several States and Territories. The measurements and computations upon which these tables were based were made with care, according to methods described in the bulletin, and the results probably represented the areas as closely as they could be determined from the maps and charts of that time. In 1899 the General Land Office printed similar tables, which were also prepared with great care and thoroughness.

The tables presented in these two publications differ from each other. Most of the differences are trifling, amounting to only a few square miles or a small fraction of 1 per cent., being well within the limits of error of the planimeter and of the maps used. Some of them, however, are considerable, and a few are explained by the fact that more recent maps, which changed the position of boundaries between States, had been used by the Land Office, and its measurement was, therefore, more nearly correct. Other discrepancies arose from difference in determining the coast lines; as an example of this, the Land Office measurement of the State of Washington included half of the Strait of Juan de Fuca, while that of the Census Office did not, involving a difference in area of 1,500 square miles.

Realizing the desirability of the Government issuing but one statement of areas of the States and Territories, the offices concerned, through their representatives, Mr. Frank Bond chief draftsman of the General Land Office, Mr. C. S. Sloane, geographer of the Census Office, and myself, representing the Geological Survey, have been at work for several months in the endeavor to come to an agreement on these figures, and in the course of our discussion many new measurements have been made from the most recent and best maps. An agreement has been reached, the results of which are set forth in the accompanying table.

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The question, "What constitutes the area of the United States?" is by no means a simple one. Jurisdiction extends to a line 3 nautical miles from the shore, but this strip of sea can not properly be regarded as a part of the country. Supposing our country to be restricted to the sea and lake coast, there remains a question regarding the bays and estuaries. To what extent should the coast line be followed strictly, and where should we begin to jump across the indentations made by the sea? In this matter one can only follow his own judgment, making in each case as natural a decision as possible, as no definite criterion can be established. This applies also to those States bordering the sea and the Great Lakes.

The method of measurement may be characterized in a few words. The areas of all square degrees included entirely within a State or the United States are taken from tables of such areas. Where a square degree is crossed by a boundary line, so that only part of it is included, both the part included and that excluded are measured from the best maps by planimeter, and the correctness of the measurement is tested by comparing their sum with the tabular area of the square degree.

The entire boundary of the United States has now been mapped or charted with accuracy, so that, aside from uncertainties due to the interpretation of the coast line, there can be little or no question as to the correctness of the measurement of the country as a whole. The situation as regards the individual States is not so satisfactory, however, although the boundaries of most of them are now well mapped. Certain States are bounded by parallels and meridians, and the ascertainment of their areas is merely a matter of reference to tables of areas of square degrees, assuming that the boundary lines were accurately run and marked in accordance with the statute. The boundaries of a few of the States, however, have not been accurately mapped, and it is probable that changes will be made in the computed areas of these States.

The area of Alaska, measured in this office from the large Coast Survey chart, is subject to considerable modification in the future as the position of the coast line becomes better known.

The area given for the Philippine Islands is that determined by the Coast Survey of that archipelago, prepared at the instance of the Philippine Census and published in that report. It also is subject to modification as accurate charts of the archipelago are made.

The areas of Hawaii and Porto Rico are probably subject to only slight change, as the charts from which they were measured are quite accurate.

The areas given for the other small possessions of the United States —Guam, Samoa, and the Panama Canal strip—will probably be changed in the future as their limits become more correctly defined.

Areas, in square miles, of the States and Territories.

STATE OR TERRITORY	LAND SURFACE	WATER SURFACE	TOTAL AREA
Alabama	51,279	719	51,998
Arizona	113,840	116	113,956
Arkansas	52,525	810	53,335
California	156,092	2,205	158,297
Colorado	103,658	290	103,948
Connecticut	4,820	145	4,965
Delaware	1,965	405	2,370
District of Columbia	60	10	70
Florida	54,861	3,805	58,666
Georgia	58,725	540	59,265
Idaho	83,779	534	84,313
Illinois	56,002	663	56,665
Indiana	35,885	469	36,354
Indian Territory	30,790	419	31,209
Iowa	55,586	561	56,147
Kansas	81,774	384	82,158
Kentucky	40,181	417	40,598
Louisiana	45,409	3,097	48,506
Maine	29,895	3,145	33,040
Maryland	9,941	2,386	12,327
Massachusetts	8,039	227	8,266
Michigan	57,480	500	57,980
Minnesota	80,858	3,824	84,682
Mississippi	46,362	503	46,865
Missouri	68,727	693	69,420
Montana	145,776	796	146,572
Nebraska	76,808	712	77,520
Nevada	109,821	869	110,690
New Hampshire	9,031	310	9,341
New Jersey	7,514	710	8,224
New Mexico	122,503	131	122,634
New York	47,654	1,550	49,204
North Carolina	48,740	3,686	52,426
North Dakota	70,183	654	70,837
Ohio	40,740	300	41,040
Oklahoma Territory	38,624	224	38,848
Oregon	95,607	1,092	96,699
Pennsylvania	44,832	294	45,126
Rhode Island	1,067	181	1,248
South Carolina	30,495	494	30,989
South Dakota	76,868	747	77,615

Areas, in square miles, of the States and Territories—Continued.

STATE OR TERRITORY	LAND SURFACE	WATER SURFACE	TOTAL AREA
Tennessee	41,687	335	42,022
Texas	262,398	3,498	265,896
Utah	82,184	2,806	84,990
Vermont	9,124	440	9,564
Virginia	40,262	2,365	42,627
Washington	66,836	2,291	69,127
West Virginia	24,022	148	24,170
Wisconsin	55,256	810	56,066
Wyoming	97,594	320	97,914
	2,974,159	52,630	3,026,789
Alaska	.....	.....	590,884
Guam	.....	.....	210
Hawaii	.....	.....	6,449
Panama Canal Zone	.....	.....	474
Philippine Islands	.....	.....	115,026
Porto Rico	.....	.....	3,435
Tutuila Group, Samoa	.....	.....	77
Total	.....	.....	3,743,344

—*Bulletin 302. U. S. Geological Survey.*

STATISTICAL RECORD OF THE PROGRESS OF THE UNITED STATES, 1800-1907.—"Statistical Record of the Progress of the United States, 1800-1907," is the title of a publication just issued by the Bureau of Statistics of the Department of Commerce and Labor, and while composed exclusively of columns of figures, the record of progress which it shows for the United States and its industries and commerce is extremely interesting. Among the many interesting facts which it presents is that the money in circulation in the United States on July 1, 1907, was 2,773 million dollars, against 2,736 millions in 1906 and 1,640 on the corresponding date of 1897, a decade ago. Deposits in savings banks are set down at 3,495 million dollars, against 3,299 millions in 1906 and 1,983 millions in 1897; the total deposits in all banks, at 13 billion dollars in 1907, speaking in round terms, against 12¼ billions in 1906 and but 5 billions in 1897. The public debt, less cash in the Treasury, is given at 878 million dollars in 1907, against 964 millions in 1906 and 987 millions in 1897; and the

per capita indebtedness, $10.26 in 1907, against $11.46 in 1906 and $13.78 in 1897. The annual interest charge of the public indebtedness on July 1, 1907, is given at 21⅔ million dollars, against 23¼ millions at the corresponding date of last year and 34⅓ millions at the corresponding date of 1897; and the annual interest charge per capita, 25 cents in 1907, against 28 cents in 1906 and 48 cents in 1897, a decade earlier.

The merchandise imported into the country is given at 1,434 million dollars in the fiscal year 1907, against 1,227 millions in 1906 and 765 millions in 1897, having thus nearly doubled during the decade; while exports of domestic merchandise are set down at 1,854 millions in 1907, against 1,718 millions in 1906 and 1,032 millions in 1897. Manufacturers' crude materials imported are given at 477 millions in 1907, against 415 millions in 1906 and 196 millions in 1897; manufactures for further use in manufacturing, at 274 million dollars, against 220 millions in the immediately preceding year and 88 millions in 1897, a decade earlier. On the export side, crude materials for use in manufacturing are given at 593 millions in 1907, against 500½ millions in 1906 and 297 millions in 1897; manufactures for further use in manufacturing, at 259 millions, against 226 millions in the immediately preceding year and 98 millions in 1897; and manufactures ready for consumption, 481 millions in 1907, against 460 millions in 1906 and 213 millions in 1897.

The records of production are also encouraging. While the figures of production are in most cases stated by calendar years and can therefore be given in this publication only for the calendar year 1906, they show in nearly all cases an improvement over the immediately preceding year. Pig-iron production for 1906 is given at over 25 million tons, against 23 millions in 1905 and 9⅔ millions in 1897. Petroleum production is given at 5⅓ billion gallons, against 2½ billions a decade earlier. The number of cotton spindles in operation in mills of the Northern States, 15⅔ millions, against 13.9 millions in 1897; and of the Southern States, 9 millions, against 3¼ millions in 1897.

Evidences of activity among the manufacturers are shown by increased importations of material used by them. Crude rubber imported during the fiscal year 1907 amounted to 77 million pounds, against 57¾ millions in 1906 and 35½ millions in 1897; raw silk imported, nearly 19 million pounds, against 17 millions in 1906 and less than 8 millions in 1897; while many other articles used in manufacturing show material gains over the imports of last year and large increases when compared with those of a decade earlier.

The popularity of American merchandise in foreign markets in various

parts of the world is illustrated, to some extent at least, by the two pages devoted to the foreign commerce of the principal countries of the world and the share of that trade with the United States. These statements show that of the imports of Canada, 60.6 per cent. were drawn from the United States, and of her exports, 38.1 per cent. were sent to the United States in the latest year for which statistics are available. Mexico took 65.9 per cent. of her imports from the United States and sent 68.6 per cent. of her exports to this country. The Central American States take a large share of their imports from the United States: Honduras, 63 per cent.; Nicaragua, 55 per cent.; Costa Rica, 54.5 per cent.; Guatemala, nearly 45 per cent., and Salvador, 31 per cent.; while of their exports Honduras sent to the United States in the latest year for which figures are available 87 per cent.; Nicaragua, 50 per cent.; Costa Rica, 47 per cent.; Guatemala, 35 per cent., and Salvador, 22 per cent. Cuba took in 1906, the latest year for which statistics are at hand, 48.6 per cent. of her imports from the United States and sent to us 84.8 per cent. of her exports, chiefly, of course, sugar and tobacco. Brazil took 11.4 per cent. of her imports from the united States and sent to us 35.1 per cent. of her exports. China took in 1906 10.4 per cent. of her imports from the United States and sent to us 10.9 per cent. of her exports; and Japan took 16.7 per cent. of her imports from this country and sent to us 29.7 per cent. of her exports. The United Kingdom, the largest importing country of the world, took 21.6 per cent. of her imports from the United States and sent to us 7.4 per cent. of her exports; while Germany took 13.9 per cent. of its imoprts from the United States and in return sent to this country 9.5 per cent. of its exports.

CLIMATE OF NEW ENGLAND.—While the topography of New England presents many diversified and pecular features, both as regards its mountains and the courses of its rivers, they are not so marked as the vagaries of its weather and the differences in the climatic conditions of its several sections. Briefly, the climate is a combination of the continental and the marine, the latter being best shown in the southeastern portion, especially on the islands of Nantucket and Martha's Vineyard, that remain as examples of the glacial action previously mentioned.

The determining causes of the climate are necessarily its pronounced physical features, its geographical position, and its location with regard to the paths of storms. There is probably no part of the United States, distinguished for its sudden and erratic weather changes, that offers to the student of climatology so rich a field for research.

The radical changes in the weather conditions that make up the several

seasons are to a large extent controlled by the areas of high and low barometric pressure that pass either (1) to the North and down the valley of the St. Lawrence, (2) directly over New England, or (3) along the coast. The low-pressure areas that take the course last named usually bring the heaviest precipitation and in winter, other conditions being favorable, are sometimes followed by intense cold waves and at times boisterous weather.

The seasons, particularly winter and summer, are well marked. The winters are long and severe, often beginning in November, with snow sometimes in October. The climax of the winter season is usually reached in February, after which there is generally a diminution in the extremes of the weather conditions, the winter practically ending with March. Snow flurries are not uncommon, and occasionally snowstorms of considerable intensity occur in April. Snow sometimes falls in May, although such occurrences are rare. The mean temperature of the winter season varies from 15° in the northern portions of New England to 33° on the islands of the southern coast. The minima for the same period range from -5° in the south to -30° and -38° in northern sections. At times the changes in temperature are striking, being so close together as to form phenomenal contrasts. The maxima, even in midwinter, rise into the sixties, followed as often by cold waves, during which the mercury falls to 30° and 40° below zero, giving a range in temperature for New England of about 100°. Conspicuous characteristics of the winters are the severe and prolonged storms, with their attending heavy precipitation, snow and rain, chiefly the former, and dangerous and at times destructive gales that sweep the entire coast with hurricane force. Snow is of common occurrence in all sections, although much heavier in the interior than along the coast. The annual average snowfall ranges from 21 to 110 inches. The average maximum fall of 90 to 100 inches covers an area extending from northern Maine southwesterly through New Hampshire and Vermont. The greatest monthly amounts usually fall in February and the largest twenty-four-hour falls in the last decade of the month and occasionally in the early days of March. The summers as a rule are short. It sometimes happens that warm and even oppressive weather occurs near the close of April and in the early part of May, but as a general rule the summers begin rather abruptly with June. Fair weather predominates, with an average amount of sunshine. During the months of July and August short periods of very warm weather occur, during which temperatures in the nineties may be experienced with an exceedingly moist atmosphere, generally described as "muggy" weather. These periods of

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warm, "muggy" weather rarely last more than three or four days. They are generally due to the passage to the west and north of a well-defined but sluggish area of low barometric pressure. Cooler weather, with easterly or ocean winds, popularly known as "easterly weather," follows the warm spells, during which the contrasts in the thermal conditions are equally as striking as those of the winter months. The average summer temperature is somewhat remarkable for equable distribution over the several States, being from 64° in the northern sections to 70° in the islands of the southern coast. Eastport, Me., however, located in the extreme northeastern portion of the State and on the immediate coast, is an exception, with a summer mean temperature of 59°. The maxima of the summer season are in greater contrast, varying from 89° along the southeastern coast to 100° or slightly more in the interior parts of Maine to Connecticut. Easterly winds are a distinctive feature of the summers, mostly as sea breezes, but at times as permanent winds. Summer terminates gradually, often merging with the delightful weather conditions known as "Indian summer," that sometimes lasts for several weeks, having its ending almost with the beginning of winter.

The annual precipitation of New England does not vary greatly, the amounts for the whole territory ranging from 40 to 50 inches. It is also remarkably well distributed through the several seasons. With slight exceptions, March is the wettest month and June the driest. Thunderstorms are recognized phenomena of the weather of New England, being most common in July and August. The annual average number is about 10, with a maximum of 25 to 30, the largest number usually occuring in the southern portion of the Connecticut Valley. Hail, sleet, and ice storms are occasional features of the climate, but are not sufficiently frequent to call for particular mention. Tornadoes of destructive force have occurred in southern portions of New England, but very rarely. The average date of the first killing frost for the entire district is September 23, and average date of the last killing frost May 12. Occasionally there are summers in which frosts sufficiently severe to kill tender vegetation occur in some sections or localities in all the summer months.

—*From Climatology of the United States.* Bulletin 2. U. S. Weather Bureau.

SNOWFALL IN THE UNITED STATES.—The average depth of snowfall by months is given for more than 600 stations in climatic tables for the several States and Territories.

Snow falls in all parts of the United States except central and southern

Florida and over the lowlands of southern California. Snow rarely falls on the immediate Pacific coast south of about latitude 42°. At San Francisco, Cal., there have been about a dozen occasions during the last thirty-three years upon which light snow fell, the heaviest fall being on February 5, 1887, when the average depth was between 5 and 6 inches. While snow is common in the mountains of southern California, it is unknown along the coast.

The snowfall on the Sierra Nevada and Caseade ranges is the greatest known in the United States. The average annual depth on the mountains is largely a matter of conjecture. Measurements made on the Sierra Nevada where the Central Pacific crosses the range give a mean annual amount somewhat in excess of 30 feet. The snowfall on the western slope of the Rocky Mountains is considerably less. At the lower levels where observations have been made, in Idaho, Montana, and Wyoming, it ranges between 50 and 60 inches. In Colorado, according to Brandenburg, the average for the western slope of the Continental Divide is 220 inches. East of the Divide in Colorado the annual snowfall diminishes from about 45 inches in the northeastern portion of the State to about 20 inches in the southeastern portion of the State. On the western slope of the Cœur d'Alene and Bitter Root mountains in Idaho the snowfall is doubtless heavier than over the western slope of the Continental Divide in Colorado. The average annual depth of snowfall at Murray, Idaho, western slope of the Cœur d'Alene Mountains, is 161 inches. East of the Rocky Mountains the region of greatest snowfall, 100 inches and over, is found in northern Michigan, western Ontario, and the lower St. Lawrence Valley. As the winds over the Great Lakes in winter are mostly west to northwest, the snowfall on the leeward side of the lakes is much heavier than on the windward side. At Duluth, at the western extremity of Lake Superior, where the prevailing winds are from land areas, the average annual snowfall is 52 inches. On the southern shore of Lake Superior, about 170 miles eastward, as at Calumet, on the Keweenaw Peninsula, the average annual amount is 131 inches, an increase of about 80 inches by reason of the lake influence. From this central region of heavy snowfall in upper Michigan and the St. Lawrence Valley, the annual amount diminishes rapidly southward and eastward. The line of 50 inches annual snowfall enters the United States on the Massachusetts coast, passes thence a little south of west to the upper Ohio Valley, thence northwestward to the southern end of Lake Huron, thence southwestward to northern Indiana, where it curves rapidly northwestward to Winnipeg, Manitoba. The line of 5 inches annual snowfall enters the United States over Albemarle Sound,

North Carolina, and trends a little south of west to Atlanta, Ga., thence westward to the Panhandle of Texas, thence southwestward to El Paso, where it curves to the northwestward, passing off the Oregon coast in the neighborhood of north latitude 44°.

In addition to the monthly averages of snowfall the climatic tables for the several States and Territories show the greatest amount of snow that has fallen in any twenty-four consecutive hours at the respective stations. The greatest twenty-four hour snowfall in northeastern districts (between 3 and 4 feet) occurred in connection with the severe storm of March 12, 1888, commonly known as the March "blizzard." Elsewhere east of the Mississippi River the largest twenty-four amounts vary from 8 inches in the Ohio Valley to 18 and 20 inches along the lower lakes. In the southern States the greatest daily amounts range from 4 inches at San Antonio to 8 inches at New Orleans. Both of these amounts fell in connection with a snowstorm which was general throughout the South on February 14, 1895. Heavy snow fell in Georgia, and the South Atlantic States in connection with the severe cold wave of February 12 and 13, 1899. Nearly 2 inches of snow fell at Jacksonville in connection with that storm. In the Mississippi Valley the greatest daily snowfall ranges from 5 inches at Vicksburg to 20 inches at St. Louis. In Iowa, Minnesota, the Dakotas, Kansas and Nebraska the greatest twenty-four hour amounts range from 9 to 17 inches. In the Rocky Mountain region twenty-four snowfalls ranging from 8 to 24 inches have been recorded. Over the Plateau region and over the North Pacific coast the amounts vary from 10 to 20 inches. In Colorado and Wyoming the heaviest snow of the year generally falls in March or April. At Denver, Colorado, on the 22nd of April, 1885, 23 inches of snow fell.

—*From Climatology of United States.* Bulletin 2, U. S. Weather Bureau.

THE RESULTS FROM ELEMENTARY SCHOOL GEOGRAPHY.—The study of geography can and should make our pupils closer observers, clearer thinkers, better reasoners. It should furnish them with information which will be helpful in almost any occupation. It should make them broad and sympathetic in their views. It should remove superstition. It should make traveling, reading and conversation more pleasurable and more profitable.

The failure of geography to enter fully into the lives of the pupils in the elementary school is not a matter of failing to provide for instruction in the subject, but rather to unwise selection and presentation of subject-

matter. Although geography has made a remarkable advance during the last two decades it is still too largely a memory subject. Mere exercise of the memory is not necessarily interesting or educative. Unless geography is training our pupils to put together the links in the chain of cause and consequence, it is being poorly taught. More important than this is the fact that it is not developing the habit of reasoning without which our pupils will, as adults, be drifted by the currents of popular opinion, now this way, and now that.

The great problem in geography is how to make the subject enter into the conscious experience of the child, for only as it is to him a living reality, as it interests him, appeals to him, and influences his life in ways which are to him apparent, will he enter consciously and purposefully into its study. The subject must do more than offer information through the medium of the printed page; it should encourage the pupil to *experience* geography, and to contribute these experiences. Such opportunity as geography offers for the exercise of the constructive faculty should be used to the fullest extent. This can be carried out in the making of maps, charts, sketches, graphs, and models of various kinds. Where these conditions are not realized the results must always be meager, superficial, unsatisfactory.

The text-book still holds, and must always hold, an important place in the study of geography. The weaknesses of the book are therefore likely to be reflected in the work of pupil and teacher. Our geographies are too incomplete. The material is too fragmentary, too statistical. This is a necessary condition where the plan of treating all or a large part of the world in one book is followed. If each book dealt with the work of a single grade the topic taken up could be more fully and more interestingly presented. This would also make possible a larger number of maps and illustrations. In order to make good this deficiency in the text supplementary readers should be very freely used. These bring out the human side of geography which always appeals to children. It is a mistake to use these books simply as readers. The topics should be studied and fully discussed by the pupils, and maps employed whenever they would be of service.

Under present conditions the questions in the text constitute an important factor in the work of the pupil. His preparation for the recitation is in large measure based upon these questions, and therefore very much depends upon their character. As a matter of fact the majority of the questions ignore the causal notion. Their study is dry and deadening to the pupil. In our very best texts about one-half of the questions tend to create thought.

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Questions pertaining to position, dimensions, area, population are legitimate, and many such should be asked, but they should not dominate the work. The function of questioning is to develop thought, not simply to secure answers. We can increase the interest and the value of the work by supplying questions of the right sort.

The following, which are simply suggestive, indicate how this might be applied to the British Isles:

Using your map, find the latitude of the British Isles. Compare this with the latitude of your own state, and with that of Labrador. Using the scale, find the length and the average width of Great Britain. Compare with the dimensions of your own state. What is the nature of the coast line? Is such a coast line an advantage or a disadvantage? Make a list of the sea-ports. Make a list of those on the Atlantic coast of the United States. Has the English Channel helped or hindered the development of the British Isles? Give reason for your answer. What part of the British Isles is best watered? Explain. If the mountains extended east and west how would they influence rainfall? Examine an isothermal chart of the British Isles and compare the temperatures with those in New England. Account for the difference. Is there snow in London during the winter? Do people sleigh-ride? Do they skate? Compare with winter conditions in Boston.

What part of England is best adapted to agriculture? Comparing the population with the area, do you think that England's agricultural products supply her demand? If not, where might she purchase wheat, flour, cotton, sugar, fruits, etc.?

Locate the coal and iron-producing sections. Locate the manufacturing areas. How are the two related? What is the meaning of the expression, "Carrying coals to Newcastle?" What advantages has Great Britain for shipping her manufactured products? What articles have you seen that were made in the British Isles? Why do people come to America from the British Isles? Why do people go from the United States to that country?

—*From the Elementary School Teacher.* University of Chicago Press, Vol. VIII, No. 2.